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THE JOURNAL OF PHILOSOPHY

VOL. XXXVI. NO. 8, APRIL 13, 1939

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PUBLISHED FORTNIGHTLY

BY THE

JOURNAL OF PHILOSOPHY, INC.

THE JOURNAL OF PHILOSOPHY

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THE JOURNAL OF PHILOSOPHY is owned by the Journal of Philosophy, Inc., 515 West 116th Street, New York, and published fortnightly at Lancaster, Pa. President, Wendell T. Bush; Vice-President, Frederick J. E. Woodbridge; Treasurer, Herbert W. Schneider; Secretary, Iris W. Wilder.

Communications to the editors should be addressed, Columbia University, New York. Subscriptions and advertisements should be sent to THE JOURNAL OF PHILOSOPHY, Prince and Lemon Streets, Lancaster, Pa., or 515 West 116th Street, New York. The annual subscription price (twenty-six numbers) is $4.00. The price of single numbers is 20 cents, except the annual bibliography number, the price of which is $1.00. Advertising rates will be forwarded on application.

Entered as second class matter, March 18, 1921, at the Post Office at Lancaster, Pa., under Act of Congress of March 3, 1879.

THE
JOURNAL
of
SYMBOLIC LOGIC

Edited by ALONZO CHURCH and C. H. LANGFORD.
Consulting editors: PAUL BERNAYS, PAUL HENLE, S. C. KLEENE, SUSANNE K. LANGER, ERNEST NAGEL, EVERETT J. NELSON, RÓZSA PÉTER, W. V. QUINE, BARKLEY ROSSER, and ALFRED TARSKI

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Published quarterly by the
ASSOCIATION FOR SYMBOLIC LOGIC

Annual membership, including subscription to the Journal, $3.00. Current subscriptions, $3.00. Completed volumes, $4.00.

Applications for membership or subscriptions should be sent to C. A. BAYLIS, Secretary-Treasurer, Brown University, Providence, R. I.

VOLUME XXXVI, No. 8 APRIL 13, 1939

THE JOURNAL OF PHILOSOPHY

PEIRCE'S THEORY OF LOGIC

I PROPOSE to state, and reveal the significance of, Peirce's opinions on the foundations of logic. I must refrain from making a prefatory appraisal of these opinions, because a blanket statement at the outset would involve more qualification than there is space for. The modernity of Peirce and the historical importance of his contribution will rather be indicated as we go on, and the results of our scrutiny will be summarized.[1]

1. *The Nature of Logic.* "Logic" is understood by Peirce in a broad and a narrow sense, as he himself recognizes (1.444). The latter, that of his earlier writings, is the traditional sense, and treats "of the formal conditions of the truth of symbols" (1.559), or, in other words, of the conditions under which conclusions may legitimately (in accordance with the professed purpose of the argument) be derived from premisses. Between logic in this sense and logic in the broader sense there is no conflict, for the simple reason that the former later becomes a branch of the latter. In this broader sense logic is nothing else than the general theory of signs, which Peirce calls, after Locke (*Essay,* II, xxi, 4), "semiotic" (e.g., 1.191, 1.444, 2.227). Semiotic, a field in which Peirce was a pioneer, is the theory of signs in all their aspects; it is the "philosophy of representation" (1.539). He also calls semiotic "the doctrine of the essential nature and fundamental varieties of possible semiosis" (5.488), and a considerable descriptive element seems to be suggested. Peirce could profitably have distinguished between descriptive and analytical semiotic, the former an empirical science concerned with the facts of the sign-situation. Judging from its subdivisions, semiotic is essentially an inquiry of analysis, and Peirce says that it is the study of representation "so far as representation can be known without any gathering of special facts beyond our ordinary daily life" (1.539). Sometimes he conceives of it so broadly as to say that "logic . . . wholly consists, one might almost say, in exactitude of thought" (2.223).

[1] All references to Peirce's writings are, except where otherwise indicated, to the Hartshorne-Weiss edition of the *Collected Papers.* For instance, "2.620" means "volume 2, paragraph 620" of the *Papers.*

On the view of logic as semiotic, Peirce is untroubled by the question whether logic has as its subject-matter thoughts or words, for thoughts too are conceived of by him as signs (e.g., 5.253, 1.538). He can not admit "that logic is primarily conversant with unexpressed thought and only secondarily with language" (2.461n.); for language, in the sense of signs, is "the woof and warp of all thought and all research" (2.220).

Semiotic or logic has three branches: "speculative grammar," "critical logic" (this alone constitutes "logic" in the earlier and narrower sense), and "speculative rhetoric." Peirce is far from clear on details in the definition of these subdivisions, and consequently on their interrelationship. But in work the influence of which is being increasingly felt in contemporary investigation this is excusable, especially since the general distinctions are clear and details can be filled in. Roughly speaking, speculative grammar is concerned with the analysis and classification of *all* signs; critical logic, with the analysis and classification of a special category of signs, arguments; and speculative rhetoric, with "the methods that ought to be pursued in the investigation, in the exposition and in the application of truth" (1.191). Critical logic assumes and depends upon speculative grammar, speculative rhetoric assumes and depends upon both of the others. According to Peirce, each of these three divisions lays down "formal conditions" for the attainment of its ends (1.559), and semiotic in general is the "quasi-necessary or formal" doctrine of signs (2.227). He is here using "formal" in a sense somewhat different from that in which it is used when "formal logic" is contrasted with "scientific method," for the latter would be subsumed under speculative rhetoric. The interpretation of his usage is made more difficult by the fact that he also calls logic or semiotic the "science of the general *necessary* laws of signs" (2.93; my italics. Cf. 4.9). I think that what he intends here by "formal," "quasi-necessary," and "necessary" is "standard": the formal conditions are standard conditions, in the sense that certain considerations determine them to be regulative or legislative. For he also speaks of the three departments as concerned with the "general conditions" of significance, validity, and truth, respectively. Thus speculative grammar will be concerned with a set of regulative or standard conditions ("rules") under which signs are to be classified, and under which any semiotic relation is to be defined; critical logic will be concerned with the standard conditions, or rules, under which inferences are to be classified and weighed; speculative rhetoric will be concerned with the standard conditions, or methods, under which we can be led to determine the actual truth of

propositions. We may add that the considerations determining a "standard" set of conditions will differ in each of these divisions. In speculative grammar, for example, it is clear that an important consideration is traditional usage; and this branch of logic accordingly involves a greater conventional element than do the other two. I do not care to discuss this matter of what determines formal or standard conditions in speculative grammar and in speculative rhetoric, because Peirce is too fragmentary in proportion to the magnitude of the subject and the discussion would consist largely of conjecture. In critical logic, however, the question of regulative or standard conditions is traditionally known as the question of validity, and I do want to consider the view of Peirce. But first a few remarks on the divisions of semiotic in regard, not to what *determines* the rules they lay down, but to the *kind* of rules they lay down.

Speculative grammar "has for its task to ascertain what must be true of the representamen [sign] used by every scientific intelligence in order that they may embody any *meaning*" (2.229); it is "the general theory of the nature and meanings of signs . . ." (1.191). The contexts indicate that "meaning" is used in what may be called its general sense, that is, as synonymous with the meaning- or sign-*relation;* so that speculative grammar would be concerned with the conditions under which the various signs function as signs. Speculative grammar is "the doctrine of the general conditions of symbols and other signs having the significant character" (2.93). Thus, for instance, the division of all signs into terms, sentences, and inferences belongs to speculative grammar. Critical logic is concerned with the types and degree of validity of inferences. Its classification of inferences is effected by laying down rules that define and govern them. For Peirce the analysis of both necessary and probable inference belongs to critical logic, though other semiotic issues are involved, belonging chiefly to speculative grammar. Speculative rhetoric, including what is ordinarily known as scientific method, and in particular the logic of discovery, is the study of methods for attaining "truth." But it is not confined to a study of methods for empirical science: Peirce regards the problem of discovering and perfecting techniques in mathematics as equally part of it. "One of the main problems of logic" is "that of producing a method for the discovery of methods in mathematics" (3.364; cf. 3.454). In accordance with this broad conception of speculative rhetoric, it is in one place described as being concerned with "those general conditions under which a problem presents itself for solution" (3.430).

In lieu of detailed examination of these divisions of logic we may make three general points. (1) What relation has the present classification to the conception of logic as "syntax"?[2] General logical syntax abstains completely from any consideration of the conceptual content of signs and confines itself to such matters as the classification of signs, the classification of types of systems (or "languages") in which signs occur, and in general the analysis of the properties of possible systems. On this conception we have not only general syntax but the syntax or logic of a given system, consisting in the formulation of its rules and the set of all statements describing its properties. Peirce's semiotic is a much wider conception of logic than is syntax, and syntax corresponds to no single division of it, except perhaps speculative grammar. But it is likely that speculative grammar would also consider questions that are today regarded as falling into "semantics." Semantics, unlike syntax, which confines itself to the analysis of sign-properties exclusively, analyzes the relations between signs and that which they designate; whence arises a special set of semantical concepts, such as "definition," "truth," "satisfaction" (as when we say "the object *a* satisfies the description 'such-and-such'"), "designation," and so on—all of which concern some kind of relation between signs and what is signified by them.[3] Thus Peirce deals at length with the problem of "the nature of propositions," which is largely semantical, as a problem within speculative grammar. It may be that he originally intended to limit speculative grammar to syntax. But it seems quite certain that he would regard formal semantical questions as within the domain of logic, and if they were excluded from speculative grammar they would appear to have no place in any of the three divisions. (2) Although the present-day conception of semiotic might alter Peirce's classification in favor of a more sharply defined number of divisions, it would not very seriously modify his fundamental contributions. He understood the primacy of speculative grammar, holding that the other departments of logic involved it. And while he never specifically analyzed the sense in which critical logic is grammatical or syntactical, the concept of the leading principle, which is the fundamental concept of critical logic, is today a most general fundamental concept of logical syntax. (3) Whatever the precise limits of semiotic, it is not difficult to see that in logic as thus conceived the doctrine of pragmatism bulks large. Pragmatism may be regarded as that branch of semiotic

[2] See R. Carnap, *The Logical Syntax of Language.*

[3] See, e.g., A. Tarski, "Grundlegung der wissentschaftlichen Semantik," *Actes du Congrès International de Philosophie Scientifique,* Fasc. iii.

which studies the conditions governing the significance of synthetic sentences, and the question of which division of semiotic it actually falls into is relatively unimportant. A study of this kind in itself comprehends a vast field, and contemporary investigations are largely concerned with attacking the difficulties in formulation and expression that it involves. That Peirce should have been more detailed in his suggestions of pragmatism as essentially an inquiry of logic, is too much to ask.[4] The very treatment of the doctrine (implicitly) as one falling in this domain, like the broad and fertile conception of logic itself, deserves much commendation.

So much for Peirce's views on the general scope of logic. I want to turn, as I said, to the subject of what constitutes validity in inference. This problem will lead us continuously into the subjects of the two succeeding sections, and we shall find that while we appear at first to be in the realm of critical logic alone, grammatical or syntactical elements become increasingly prominent.

In the unfinished "Minute Logic" of 1902–1903 Peirce reviews various opinions on the question of validity. For example, the basing of (critical) logic upon a system of metaphysics he holds to be a "vicious order of thought" (2.38). Much more important is his emphasis that the subject-matter and validity of logic are independent of psychology. The view, made popular by Mill, that logic's "theoretic grounds are wholly borrowed from psychology" (*Examination of Hamilton's Philosophy*, 5th ed., p. 461), had to a certain extent been controverted, Peirce points out, by Kant and Herbart; and Venn, though a follower of Mill, did not assume it. Peirce himself, however, was among the first to dwell consciously and at length on its refutation.

> Logic is not the science of how we do think; but, in such sense as it can be said to deal with thinking at all, it only determines how we *ought* to think; nor how we ought to think in conformity with usage, but how we ought to think in order to think what is *true*. That a premiss should be pertinent to such a conclusion, it is requisite that it should relate, not to how we think, but to the necessary connections of different sorts of fact. [2.52]
>
> How we think, therefore, is utterly irrelevant to logical inquiry. [2.55] [Cf. 5.157, 2.232, 2.210, 5.329.][5]

[4] See 6.490, 5.18, 5.465, and letters to James (in Perry, *Thought and Character of William James*, Vol. II, p. 427) and Ladd-Franklin (in this JOURNAL, Vol. XIII, 1916, p. 720).

[5] In earlier writings Peirce is not so emphatic, and in 1883 he says: ". . . Formal logic must not be too purely formal; it must represent a fact of psychology, or else it is in danger of degenerating into a mathematical recreation" (2.710).

Peirce has a comment on Dewey: "[Professor Dewey] seems to regard what he calls 'logic' as a natural history of thought. If such a natural history can be worked out, it will undoubtedly form valuable knowledge. . . . [But] if

Peirce's own conception of logical validity is directed against another, which assumes two forms, and which he is much concerned to refute. In one of these forms it has been known since Aristotle as the criterion of "self-evidence." Peirce's distaste for it—the obscure status of the "self-evident" is one of his favorite targets—is based chiefly on the ground that it fosters individualism in inquiry. Against the other form in which this criterion is stated, the same charge is less easily brought. For it holds that the ultimate test of valid inference is an immediate, instinctive feeling of "rationality." This *Gefühl*-criterion Peirce associates most commonly with the name of Sigwart (5.85, 2.19–20, 2.209), and his respect for it is heightened by the fact that he finds it in Schröder. "Schröder," he says, "followed Sigwart in his most fundamental ideas of logic" (5.85), defining "logical consequentiality as *a compulsion of thought*" (3.432). The tradition that has arisen from the *Gefühl*-criterion, which is after all a species of psychologism, Peirce dubs the "German" theory of logic, and the contrary theory, his own in the guise of another worthy tradition, is the "English," "objective conception of logic" (2.185). The German doctrine supposes a non-cognitive faculty as final authority, and while this faculty appears to be social in that it is instinctively common in members of the human race, its claim to authority can be tested by nothing more than reiteration, by advice to exercise one's powers of rational insight,—that is, it can not be tested at all. Peirce arrives at the expression of his own, the "English" view, by making the criterion of logicality state the condition of its own testing: Reasoning is valid when the facts are such as the conclusion represents them to be, whenever the facts are also such as the premisses represent them to be. The guarantee of validity is the *fact* that the conclusion is true when the premisses are true.

> Every reasoning holds out some expectation. Either, for example, it professes to be such that if the premisses are true, the conclusion will always be true, or to be such that the conclusion will usually be true if the premisses are true, or to be a method of procedure which must ultimately lead to the truth, or makes some other such promise. If the facts bear out that promise, then, say the English, the reasoning is good. But if the facts violate the promise, the

calling the new natural history by the name of 'logic' (a suspicious beginning) is to be a way of prejudging the question of whether or not there be a logic which is more than a mere natural history, inasmuch as it would pronounce one proceeding of thought to be sound and valid and another to be otherwise, then we should regard this appropriation of that name to be itself fresh confirmation of our opinion of the urgent need of such a normative science at this day" (Review of *Studies in Logical Theory*, in *Nation*, 1904, Vol. 79, p. 220).

reasoning is bad, no matter how deliberately human reasoning may have approved of it. For the sole purpose of reason is, not to gratify a sense of rationality analogous to taste or conscience, but to ascertain the Truth. . . . [2.153]

Thus in the case of necessary inference, which professes to be such that in any given class of such inferences the conclusions are always true when the premisses are true, and in the case of probable inference, which professes to be such that the conclusions are true a certain proportion of all the times the premisses are true, the criterion of validity is the actual fact that the conclusion *is* always, or *is* sometimes, true. "The rationality of a reasoning, in the sense of that character of a reasoning at which the reasoner aims, does consist precisely in that necessary accord of the facts with the professions of the argument" (2.159).

But Peirce by no means wants to neglect the psychological aspect of reasoning, and in fact he bolsters his standard of validity by showing that this standard is the one tacitly assumed when men perform their multitudinous inferences. Instead of assuming an *instinct* of rationality by means of which reasonings are trusted, he holds that it is on *habits* of reasoning, tested by experience, that we rely. These habits are formed by our continually representing to ourselves what would ensue when we make certain suppositions, that is, what in fact would have to be the case, or probably be the case, if certain premisses were true. We form habits of reasoning by diagramming facts in the imagination. In so doing we need not exhaust all possible particular cases in order to perceive a necessary or probable relationship, but select cases that, by their generality, give us assurance of their representative character. This notion of imaginative experimentation by means of which we form the habits of, and check on the soundness of, our reasoning, is a pervasive and favorite theme of Peirce. When applying it to complex necessary reasoning such as mathematics, he calls it "ideal experimentation" (3.528) or "abstractive observation" (2.227). The habits formed as a result of continually representing to ourselves experiential situations connected in certain ways are the factors that determine the validity of all reasoning. For there are (logically) good and bad habits, and the question of the logical goodness or badness of these habits is not itself a psychological matter (cf. 5.365). It is a question of whether they do in fact lead to true conclusions from true premisses. And the habits that we form are on the whole good habits, because we continue to improve them. In so far as they *are* habits of reasoning that *do* enable us to draw correct conclusions, they constitute our *logica utens,* the acritical and implicit

logic of the common man. It is when these habits become expressed linguistically as rules of inference, or conscious leading principles, that our logic ceases to be a *logica utens* and becomes a *logica docens,* or formulated, scientific and critical logic (cf. 2.186ff.).

The presence of the foregoing empirical or pragmatic strain in Peirce's critical logic is perhaps wholesome as opposed to the subjectivist criterion of an infallible rationality-instinct. But it is open to serious difficulties, because it is not confined, as it should be, to a genetic account of what is involved in the reasoning process and how good reasoning comes to be distinguished from bad reasoning. Psychogenetically, the criterion of the validity of our arguments consists in the actual fact of whether the conclusions of these arguments are true when the premisses are true. Logically, however, the mere criterion of empirical success is not adequate to explain necessary reasoning. In the "Minute Logic" (and elsewhere) Peirce confusedly overlooks this distinction. Necessary reasoning is there simply a limiting case of probable reasoning: since in the latter conclusions are in fact true a portion of the times that the premisses are true, indefinite increase in the magnitude of this portion is regarded as an approach to demonstration (cf. also 2.694). This application of a single standard to both necessary and probable inference, allowing for a difference in degree but not in kind, is a step in the direction of sensationalism. For it follows that the principles of logic are "necessary" merely in the sense that they have never failed to be verified. And in admitting so unsatisfactory a consequence we open the door to a contrary contention, that in view of the indubitability of necessary inference, the principles of logic must be *a priori* laws of thought. The application of the empirical standard of validity defines probable inference and constitutes a major contribution by Peirce to the subject. But its application to all inference misinterprets the character of necessary reasoning and identifies it with reasoning having the probability 1. That such reasoning should always lead to true conclusions from true premisses is not a sufficient condition for its definition. Peirce himself on occasion realized this (cf. 2.369, 5.24). An attractive explanation for his advocacy of the view in question would be that the distinction was not essential for the semi-pedagogical purposes of the "Minute Logic." But it is not characteristic of Peirce to modify for special purposes views that he would otherwise have considered important: even in his most popular writings he prefers to sacrifice interest to a high degree of accuracy. We shall see that apologies are not really necessary, and that a more fundamental

conception of validity can be discovered in Peirce. By giving his treatment of inference in terms of leading principles linguistically expressed, the present objectionable view can be better stated and the means of correcting it can be revealed. But unfortunately, we do not thereby rule this view out of existence: Peirce seems never to have been aware of the conflict.

2. *Leading Principles.* Let us speak, not of this or that inference, but of *classes* of inference; where by "class" we shall understand "the *total* of whatever objects there may be . . . which are *of a certain description*" (1.204; my italics). Then, in whatever way we differentiate necessary from probable inference, we shall at least say that an instance of necessary inference belongs to a different class of inferences from an instance of probable inference.

> . . . In a logical mind an argument is always conceived as a member of a *genus* of arguments all constructed in the same way, and such that, when their premisses are real facts, their conclusions are so also. If the argument is demonstrative, then this is always so; if it is only probable, then it is for the most part so. [2.649]
>
> To say that an argumentation is valid is to say that it is as truthful as it pretends to be. It is essential to reasoning . . . that it should be accompanied by the reflection that it belongs to a class of reasonings, few or none of which lead from truth to falsity. All reasoning, therefore, makes a pretension; and if that pretension is true, the reasoning is *valid.* [2.446]

In view of the above definition of "class," where emphasis is laid not merely on a collection but on a collection of a definite description, the difference between the first of these quotations (2.649), in which Peirce speaks of a *genus* of arguments, and the second (2.446), in which he speaks of a *class* of arguments, is not important for our present purpose. We should be aware, however, that the latter extensional emphasis is important for probable and not for necessary inference, and that the gist of Peirce's distinction consists in this point.

The defining principle of a class of inferences is called the leading principle of that class. A leading principle is a rule of inference, without which any inference is impossible, such principles usually being linguistic formulations of the habits employed in ordinary reasonings (3.164). An argument is valid if its leading principle is "true" (2.463) (or in the words of the second of the preceding quotations, if its "pretension" to lead to true conclusions from true premisses is true). The leading principle of an argument must be distinguished from the premisses of that argument (2.465). Both premisses and leading principle must be "true" in order that an argument should be valid (2.464).

Let the premiss of an argument be designated by "P," and the conclusion by "C," the argument being "$P \therefore C$." Let the leading principle of this argument be designated by "$P \rightarrow C$," which may be read "P implies C," abbreviated as "M" (cf. 3.165, 2.466). Now when we assert the argument "$P \therefore C$," M is not expressed; but it is tacitly assumed, else the argument can not be valid. But we can have the following argument: "M and $P \therefore C$." Thus a leading principle may be added to the premisses of an argument; and in the same way, a premiss may not be expressed as a premiss, but may be assumed as part of the leading principle. In the argument "Smith is a man $\therefore$ Smith is mortal," the additional assumption usually made as premiss, "All men are mortal," is part of the leading principle. But we can never entirely reduce the premisses to the leading principle, nor entirely reduce the leading principle to premisses. For in the case of "M and $P \therefore C$," this too has its leading principle of inference, which may be designated by "L" (cf. 3.168, 2.466). Here a fundamental distinction comes to be made between two types of leading principles. "Smith is a man $\therefore$ Smith is mortal" is not a necessary argument; but if its leading principle "All men are mortal" is added to the premisses and assumed as true, it becomes a necessary argument. The principle of this (L) is: "($P \rightarrow C$, and P)$\rightarrow$C." When this in turn is added to the premisses we get "L and M and $P \therefore C$." But this does not differ from "M and $P \therefore C$." The premisses of the latter argument are of themselves sufficient to determine C necessarily, and therefore already contain L. And the former argument, though it explicitly contains L among the premisses, will nevertheless still have L as its leading principle. A principle "which contains no fact not implied or observable in the premisses" (3.166), "which can not be eliminated" from the leading principle (2.466), Peirce calls a "logical principle." Thus in the foregoing L is a logical leading principle. At this point we may quote Peirce himself, from the article on leading principle in Baldwin's Dictionary.

> Suppose that the leading principle involves two propositions, L and L′, and suppose that there are three premisses, P, P′, P″; and let C signify the . . . conclusion. . . . Then, from the five premisses L, L′, P, P′, P″, the inference to C would be necessary; but it would not be so from L, L′, P′, P″ alone, for, if it were, P would not really act as a premiss at all. From P′ and P″ as the sole premisses, C would follow, if the leading principle consisted of L, L′, and P. Or from the four premisses L′, P, P′, P″, the same conclusion would follow if L alone were the leading principle. What, then, could be the leading principle of the inference of C from all five propositions L, L′, P, P′, P″, taken as premisses? It would be something already implied in those premisses; and it might be almost any general proposition so implied. Leading principles are,

therefore, of two classes; and any leading principle whose truth is implied in the premisses of every inference which it governs is called a "logical" (or, less appropriately, a *formal*) leading principle; while a leading principle whose truth is not implied in the premises is called a "factual" (or *material*) leading principle. [2.589]

Thus the ordinary logical principles of inference are logical leading principles; while (to use the above example) "All men are mortal" is a material leading principle. With greater economy we may now express (i) the criterion of validity: the validity of an argument is determined not by *Gefühl,* but by the objective consideration of whether its leading principle is "true"; (ii) the distinction between necessary and probable arguments: a necessary argument is one governed by a logical leading principle, a probable argument is one governed by a material leading principle.

Peirce speaks of the leading principle as a "proposition" and as "true." This would imply that leading principles are sentences or assertions in the same sense as the sentences constituting the argument. If this were the case, there would be no point in using the concept of the leading principle at all. We should speak only of the sentences essential to an inference, and not go beyond classifying inferences as either complete or enthymematic. What follows will reveal that Peirce tacitly recognized this, and that his use of "proposition" and "true" to characterize leading principles is largely for the sake of convenience. The usage may seem to be justified to the extent that premisses may function as leading principles. But in so far as they do so function, they have a different status from that which they have as premisses. The expressions regarded as leading principles may from another viewpoint be regarded as assertions, true or false: they would then *ipso facto* belong to an inferential system with leading principles of its own. These considerations, which have been developed in detail by comparatively recent logical theory, are not latent in the mind of Peirce. But it should be remembered that he looks most often on leading principles as habits that need not be expressed in order to be regulative of inference. Clearly a habit is not true or false; it can at most be called "successful," "useful," or "desirable." Those leading principles which he regards as purely conventional (cf. 4.359–363, 4.485ff.) have *a fortiori* no truth-value or assertiveness. With respect to the material leading principle, which governs probable arguments, it does not, in Peirce, really act as a universal synthetic statement, which is the form he employs for illustration. It acts as a propositional function the values of which must be statistically ascertained for that proportion which is true (strictly, it should be stated "x is a man

and x is mortal," indicating the relative frequency with which both premiss and conclusion are true). When we assumed in the preceding paragraph that its transfer to the premisses made the argument demonstrative, we assumed for simplicity's sake that it was in fact true for all values (and in any case it would have to have been statistically determined for some values in order to be a proposition and function as premiss).

Purely logical principles, Peirce holds, are "empty, or merely formal propositions" (3.168). And he also says, "We can not recognize logical formulae as, properly speaking, assertions" (2.451). For if such a formula "be intended to state anything about real things, it is quite unintelligible" (2.315). He suggests in one place that any such principle, in so far as it has any signification at all, "must be understood to mean something about symbols" (2.315). In the context what he seems to mean by this is that, for instance, the principle of identity "A is A" (his example) defines the relation of reflexiveness; for he says, "the substantive verb 'is' expresses one of those relations that everything bears to itself." But elsewhere he is much more explicit in the conception of logical principles as linguistic. He says that "logical principles of inference are merely rules for the illative transformation of the symbols of the particular system employed. If the system is essentially changed, they will be quite different" (2.599; cf. 4.481, 2.467). In 1868 he had in effect divided leading principles ("guiding principles" then) into material and logical by saying that such a principle might involve either "some matter of fact concerning the subject of argument, or merely a maxim relating to a system of signs" (5.280).

Now it is in terms of this conception of logical leading principles as non-assertive rules for the translation of signs (sentences) that Peirce might most profitably have explained the validity of necessary as opposed to probable inference, and not in terms of the view which we found the "Minute Logic" to develop. It is not the degree of empirical success with which the two types of inference meet that will explain their difference. Necessary inference is not simply a limiting case of probable inference, especially since on Peirce's own view an argument may have the probability 1 though it lead to false conclusions any finite number of times (cf. 2.357). A given argument that purports to be necessary is guaranteed to be so by the form of its leading principle or rule. An argument that purports to be probable with a certain numerical value is determined to be so by empirically ascertaining whether its rule or leading principle, which refers to a whole class of similar arguments, holds for a

percentage of those arguments equal to the numerical value. It is in this sense that the genus is what interests us in necessary arguments, and the class in probable arguments. Speaking of probable inference in the widest sense (i.e., where "probable" means simply "not necessary"), it is essential, in weighing the conclusion of such an inference, to examine as many members as possible of a class of inferences to which it is considered as belonging. This examination will affect the "strength," "probability," or whatever the property may be, which is to be assigned the conclusion. But in necessary argument, an inspection of the leading principle, to ascertain whether it is a logical principle or not, suffices to determine whether the conclusion does or does not follow necessarily. In a necessary argument alone does the defining principle also guarantee validity. "The only kind of reasoning which can render our conclusions certain . . . attains this certainty by limiting the conclusion . . . to facts already expressed and accepted in the premisses" (2.664). The necessity of necessary reasoning consists not in the fact that it is always ratified empirically, but in the fact that it is analytic, the analyticity determined by a logical rule decreeing it. It is when this point of view concerning validity is uppermost in his mind that Peirce regards as a historical curiosity Mill's opinion that the principles of logic are inductive generalizations (5.167). Necessary reasoning is purely formal and independent of extra-systemical meaning: "What people call an 'interpretation' is a thing totally irrelevant, except that it may show by an example that no slip of logic has been committed" (4.130).

Peirce's concept of the leading principle, ill-expressed as it is in certain critical details, is a profound recognition of the distinction between a deductive system and the inferential rules governing it, and the dependence of the character of the system upon the character of the rules. Though the concept has been considerably refined since Peirce, it was in his day a notable advance over the concepts then analogous to it (employed chiefly by mathematicians), and its equivalent is the rule of transformation as understood today.[6] The extent to which Peirce sensed the importance of distinguishing between the sentences constituting a system and that system's rules is seen when, in constructing a Boolian calculus, he discriminates "the principles of logic themselves" (the rules regulative of the calculus) from the "maxims" of logic (which here, unlike 5.280, mean the logical propositions

[6] The distinction between logical and material leading principles corresponds to the present-day distinction between logical and physical transformation rules ("*L*-rules" and "*P*-rules"). See Carnap, *op. cit.*, § 51.

occurring within the calculus) (3.41). The need of the separation is expressed by Peirce when he says in medieval language that "reasoning moves in first intentions, while the forms of logic are constructions of second intention" (2.599).[7] The view that logical principles are rules concerned with the systemic manipulation of signs is a consequence of the distinction between argument and leading principle. The defective element in Peirce's treatment of the leading principle is its lack of specificity. He fails to give enough examples of leading principles, and we are often uncertain how on his view they would be stated. This is especially the case in arguments that have material leading principles. It is uncertain, for instance, how the leading principle of an induction is to be stated.

In a manuscript of 1903 intended as an exposition of his system of "existential graphs," Peirce makes a thorough-going attempt to construct a symbolic system by enunciating in detail the rules that are to govern it. He lays down not only rules of transformation but also, going beyond ordinary mathematical practice, rules for the organization and construction of the system's elements.

> We frame a system of expressing propositions—a written language—having a syntax to which there are absolutely no exceptions. We then satisfy ourselves that whenever a proposition having a certain syntactical form is true, another proposition definitely related to it . . . will necessarily also be true. We draw up our code of basic rules of such illative transformations, none of these rules being a necessary consequence of others. [4.481]

The "framing of the syntax" of the system, of its "grammar" (4.475), would today be called setting forth the "rules of formation." These analyze the type, number, and structural interrelation of the signs that constitute the system; they state "all the fundamental conventions of the system" and the conventions derived from these (4.423). Together with the "rules of transformation" (4.423, 4.475), they form the "syntax" in the present-day sense. (Peirce says that his system is not intended as a "calculus." But what he understands by the word here is a mathematical instrument or mechanism for facilitating the drawing of conclusions. The system is, of course, a "calculus" in the sense that its constructions and inferential relations are determined by explicit rules or conventions. See § 3.) But Peirce fails, in the system of rules that he lays down, to differentiate with any clarity

[7] These considerations correspond in a rudimentary way to the distinction between the "object-language" (e.g., the Boolian calculus) and the "syntax-language" (comprising sentences about the calculus). Cf. Carnap, *op. cit.*, p. 4.

at all just what is "eternal verity" from what "merely characterizes the special language of existential graphs" (4.477). We have already seen his statement that the so-called logical principles of inference become "quite different" when the system is changed. Today it would be said that the system is by definition changed when its rules are changed rather than vice versa; but essentially the same point *seems* to be intended by Peirce here, where the "logical principles of inference" become "rules of illative transformation." It is of interest and significance to note, in connection with Peirce's general purpose in the paper under consideration, what Benjamin Peirce, in his *Linear Associative Algebra* of 1870, edited by Charles in 1882, says, with similar purpose: "The symbols of an algebra, with the laws of combination, constitute its *language*. . . . The language of algebra has its alphabet, vocabulary, and grammar" (pp. 2–3, ed. 1882). The alphabet and vocabulary are together equivalent to the rules of formation or construction, the grammar to the rules of transformation. "The *alphabet* of an algebra consists of its letters; the *vocabulary* defines its signs and the elementary combinations of its letters; and the *grammar* gives the rules of composition by which the letters and signs are united into a complete and consistent system" (p. 3).

3. *On Fact and Formalism in Logic.* Another noteworthy insight of Peirce is his view that all logical propositions (as against rules) are "indistinguishable" (3.41). Between one analytic sentence and another there are no essential differences (cf. 3.148), so that the old view of three "laws of thought" as being eminently the logical propositions is erroneous.

But in our general attempt to indicate Peirce's modernity we must guard against forcing the issue and reading into what are after all not fully elaborated writings too much of an anticipatory character. Although the conventional status of logical rules is to some extent asserted by him, it is quite certain that he would not subscribe to so radical a conventionalism as that of some contemporary logicians. In his conception of the possible types of such rules, and their relative importance, he is inadequate, holding, for example (though in 1867), that substitution is not genuine "inference" (2.496); from which it would seem to follow that a rule of substitution is not a genuine transformation rule or is an unimportant one. But it is the nightmare of inconsistency that is Peirce's worst enemy and that threatens his conventionalism. Most significant is the fact that whereas for modern conventionalism the problem of "non-Aristotelian logic" becomes a dead issue, Peirce does not seem to think so. In a letter to Francis C.

Russell (quoted by P. Carus in *Monist*, vol. XX, 1910, p. 45), he says:

> Before I took up the general study of relatives, I made some investigations into supposing the laws of logic to be different from what they are. It was a sort of non-Aristotelian logic, in the sense in which we speak of non-Euclidean geometry. Some of the developments were somewhat interesting, but not sufficiently so to induce me to publish them. The general idea was, of course, obvious to anybody of sufficient grasp of logical analysis to see that *logic reposes upon certain positive facts, and is not mere formalism.* Another writer afterward suggested such a false logic, as if it were the wildest lunacy, instead of being a plain and natural hypothesis worth looking into (notwithstanding its falsity). [My italics.]

This passage plunges us back at once into the view that the principles of inference depend upon fact. From speaking of transformation rules we return to "laws of logic," by means of which we efficaciously draw true consequences from true assumptions. "Non-Aristotelian logic" is neither equally admissible nor absurd; it is false; its laws are contrary to fact. This of course means that the drawing of true consequences from assumptions that are true is not due to a formal, syntactical guarantee, but to a kind of faithfulness to reality on the part of the logical laws. This in turn means, contrary to a statement quoted above, that necessary inference must ultimately resort to interpretation to justify its necessity. The logical laws are "not absolutely certain" (4.77). Critical logic, unlike mathematics, "is categorical in its assertions" (4.240). While it is a "normative science," it is also a "positive science" in that only "by asserting positive, categorical truth" can it show that good reasoning really is so (5.39). Elsewhere, "the logician does not assert anything . . . but there are certain assumed truths which he hopes for, relies upon, banks upon . . ." (4.79).

To this vacillation between an unmistakably positive and an unmistakably conventionalistic conception of necessary inference, we must make an addition. This is the amazing circumstance that Peirce speaks of logic as "reposing upon positive facts" in an altogether different sense from the one just stated. Consider the following: ". . . Logic does rest upon certain facts of experience" (5.110); the "facts of which logic needs to take cognizance" are "the facts of doubt, truth, falsity, etc." (2.537; cf. 2.66). "That belief tends to fix itself under inquiry is . . . one of the facts with which logic sets out" (2.693). And, similarly, the "facts" which logic must assume—and he calls them also "logical principles"—comprise "all that is implied in the existence of doubt and of belief, and of the passage from one to the other, of truth and of falsehood, of reality, etc." (Review of C. Read, "The

Theory of Logic," *Nation,* vol. XXVIII, 1879, p. 235). *This* conception of logic as reposing upon "fact" occurs when Peirce has in mind the genesis of logic. It would be clear if we could quote the entire context of the following passage. Peirce is emphasizing that our beliefs, or belief-habits, are in large measure fixed or determined by "peripheral excitations."

> Is there any law about the mode of the peripheral excitations? The logician maintains that there is, namely, that they are all adapted to an end, that of carrying belief, in the long run, toward certain predestinate conclusions which are the same for all men. This is the faith of the logician. This is the matter of fact, upon which all maxims of reasoning repose. . . . Hence, if a given habit, considered as determining an inference, is of such a sort as to tend toward the final result, it is correct; otherwise not. Thus inferences become divisible into the valid and the invalid; and thus logic takes its reason of existence. [3.161]

Here logic rests upon fact not in the sense that it is validated by fact, but in the sense that the criteria of validity are developed in experience. The "maxims" of reasoning, which are beliefs, come to be recognized as sound because they inevitably compel universal agreement. The "facts" of belief, doubt, and the like are thus essential to a genetic account of logic.

Had Peirce come to realize that only in this second sense does logic rest upon fact, he would have become conscious of the positive and conventionalistic tendencies struggling side by side in his writings. He might have called logical principles "transformation rules" in any case, and then asked himself whether these rules are legislative guarantees of necessary inference, or somehow descriptive of experiential testing of inference by interpretation. (A discussion of the analyticity of deduction in Peirce's philosophy of mathematics would produce corroboration of the former view. But peace would still not be for us: we would encounter a third, very explicit, criterion of validity in necessary inference!)

In the letter to F. C. Russell quoted above, Peirce states that logic, by resting on facts, "is not mere formalism." What the attack on formalism there amounted to was an attack on conventionalism. There is an emphasis against "formalism" in another sense, which is partly connected with this one. The purpose of what is known as "formal" or "mathematical" or "symbolic" logic, Peirce holds,

> . . . is simply and solely the *investigation of the theory of logic, and not at all the construction of a calculus to aid the drawing of inferences.* These two purposes are incompatible, for the reason that the system devised for the investigation of logic should be as analytical as possible, *breaking up inferences into the greatest possible number of steps, and exhibiting them under the most general categories possible;* while a calculus would aim, on the contrary, to reduce

> the number of processes as much as possible, and to specialize the symbols so as to adapt them to special kinds of inference. [4.373; my italics.]

The most important type of inference is mathematical inference, and the purpose of formal logic would seem to be largely the analysis of the structure of mathematics. Peirce declares this to have been the purpose of the logical algebras that he had constructed on previous occasions, and regards his system of graphs as a great improvement over them in this respect (4.429). But what he means by "analysis" and by "breaking up inferences into the greatest possible number of steps and exhibiting them under the most general categories" is not clear. (*a*) In the preceding quotation and elsewhere it seems to be very much like a psychological analysis, aiming to discover every step that actually enters into the reasoning process, especially the complex instance of mathematics. (*b*) It may be that by denouncing "mere formalism," which he characterizes as "the mere construction of calculi," Peirce is warning against the duplication of mathematics by constructing systems and forgetting the rôle of semiotic analysis, the purpose of critical logic in its modern symbolic guise being the study of properties common to all systems. Thus he says that an interest in the essential elements of a mathematical hypothesis and of deductive processes "in their intellectual pedigrees and in their conceptual affiliations with ideas met with elsewhere . . . is the logical interest, *par excellence*" (4.370). And he says also that the logical analysis of an algebra is "directed toward the essential elements of the algebra," while the mathematical interest is "towards the solution of problems" (3.322). In short, he finds speculative grammar too much neglected in critical logic (cf. 3.341).

I think that although both (*a*) and (*b*) represent Peirce's intent, the emphasis here is predominantly on the latter (cf. 3.451). But if so, why the attack on "calculi," for would not the invention of new deductive systems increase the understanding of the properties common to deductive systems in general? The answer is, of course, that Peirce uses "calculus" in the mathematical rather than the logical sense, and means by it "calculus to aid the drawing of inferences." ". . . The chief advantages of the new systems of formal logic" are the "broad and philosophical aperçus" that they make possible, "much more than any facilities they afford for drawing difficult conclusions" (Review of Jevons, "Studies in Deductive Logic," *Nation*, vol. XXXII, 1881, p. 227). The gist of Peirce's attack on formalism is really a plea for emphasis on the foundational as opposed to the purely technical aspect of symbolic logic.

> The employment of algebra in the investigaion of logic is open to the danger of degenerating into idle trifling of too rudimentary a character to be

> of mathematical interest, and too superficial to be of logical interest. It is further open to the danger that *the rules of the symbols employed may be mistaken for first principles of logic.* An algebra which brings along with it hundreds of *purely formal theorems of no logical import whatever* must be admitted, even by the inventor of it, to be extremely defective in that respect, however convenient it may be for certain purposes. [3.619; my italics.]

The italicized portions of this passage show that Peirce's attack on formalism in the present sense is connected with that on linguistic and conventionalistic formalism. For clearly a conception of what constitutes the "first principles of logic" affects the opinion of what is foundational and what purely technical. If Peirce had continued in the strain of his relativistic conception of transformation rules, the contrast between "the rules of the symbols employed" and "first principles of logic" would be nothing more than that between the rules of a given calculus and the concept of the transformation rule in general. But in this passage the contrast seems rather to be between the rules of a given calculus and the "laws of logic." When his inclination toward this emphasis is most prominent Peirce is certainly most vague, and just what he means by a theorem "of no logical import" as opposed to a theorem "of logical import" I am unable to say.

An examination of Peirce's ideas on mathematics would reveal the same juxtaposition of striking analysis with elements making for inconsistency. Peirce's thought on the foundations of mathematics and logic does not form a systematic body of opinion. The many valuable and anticipatory insights that punctuate it represent gropings in a domain which he apparently never had the leisure to contemplate as a whole. But if we adopt a dispassionate perspective we can not fail to be impressed by the weight of his contribution, especially if we realize that it was produced between 1867 and the first three or four years of this century. His emphases on such cardinal points as the distinction between logical and material leading principles, and the distinction (which we have not considered) between formal mathematics and natural science, are important emphases today; and his conception of logic as semiotic opens a field which has only recently begun to be explored. No less alive are his rigid exclusion of psychology from logical analysis and his special studies in the nature of deductive systems. I suggest that Peirce's stature as a logician becomes doubly impressive when the type of work we have considered is linked with the more technical contributions by which he is somewhat better known and of which we have made little mention.[8]

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[8] An account of these is given by C. I. Lewis, *A Survey of Symbolic Logic*, pp. 79–106.

BOOK REVIEWS

Proceedings of the Aristotelian Society. New Series, Vol. XXXVIII, 1937–1938. London: Harrison & Sons, Ltd. 1938. 328 pp. 25 s.

Action, Perception and Measurement. Aristotelian Society Supplementary Volume XVII. London: Harrison & Sons, Ltd. 1938. 194 pp. 15 s.

The volume of *Proceedings* is rather less interesting than usual. Too many of the papers are written in the "before presenting my main thesis may I say this" style, and the main thesis gets lost in the underbrush. Mr. Bertrand Russell's presidential address has a title, "On Verification," which may lead the reader to expect rather more than he gets, but there is a good deal to be read between the lines. Russell is chiefly concerned to question the views of Neurath and Hempel, and to some degree Carnap, in so far as "they think that language can be treated in isolation, without assuming that it refers in any way to facts outside itself," but rather, quoting Hempel, referring to what are, as statements, that which is "actually adopted by mankind, and especially by the scientists of our culture circle." Russell replies, "I find it difficult to believe that these philosophers, who profess to be empiricists, can really mean what they say," for with this interpretation "the whole basis of empiricism, namely the appeal to experience, is gone."

One of the most profitable papers is that of Professor R. G. Collingswood, "On the So-called Idea of Causation." He traces the early uses of the word "cause," distinguishing causing in the sense of inducing someone to do something, the cause in the sense of the factor in a situation which may be brought under our own control, and thirdly, the supposedly strict idea of cause, which is intended to be entirely theoretical and not practical. This third use is illegitimate, and is even contrary to the proper notion of scientific law. He largely blames Kant, for reasons that are not quite clear, for the confusion of senses two and three. Nor does he make it quite certain that there may not be legitimate and unambiguous uses for the term "cause" even in the theoretical sphere, as when one speaks of a "causal system," and does not mean a "law," or repetition of sameness, but a relationship of things diverse.

Among the other papers may be mentioned Mr. R. E. Stedman's defense of speculative philosophy, in which he denies the current distinction of "critical" and "speculative" philosophy, as anything more than two aspects of the same thing; Professor

A. E. Murphy's further criticism of Broad's "critical" philosophy; and, along a somewhat different line, Mr. J. A. Lauwery's contrast of instruments of observation and instruments of measurement.

In the *Supplementary Volume,* Professor John MacMurray and Dr. A. C. Ewing really clash on the question, "What is [ethical] action?" This makes the most interesting symposium in the book, though there may be more definite results in some of the others, including especially Mr. Norman R. Campbell's paper on the nature of measurement, and the debate on "The Relevance of Psychology to Logic." In the latter, Mr. Bertrand Russell maintains, "The non-mental world can theoretically be completely described without the use of such logical words as 'or,' 'not,' 'all,' and 'some.'" These, therefore, he would place in the realm of "psychology." One wonders whether these terms of "discourse," or of what Professor Dewey would call "the instruments of inquiry," are not too closely connected with the interrelations of the mental and non-mental to be considered, in any proper sense, purely mental or "psychological." Also one may wonder whether, granting that such terms as "either-or," and its correlatives (including "and," "not," or "if-then," as used in, let us say, symbolic logic) belong entirely to the realm of "discourse," being, as Professor Dewey might claim, inventions for the furthering of inquiry and social intercourse, there may not be an additional meaning of "and" and "not," and likewise of "implication," more metaphysical, so much so, in fact, that no realm, however "non-mental," could either *be,* or *be described,* without these factors of conjunctivity, and negativity, and even pattern and system. But that is a further, and a long, story.

H. T. C.

Wirklichkeit und Sinn. Band I. Die objektive Gewordenheit des Sinns in der Sinnfreien Wirklichkeit. Band II. Das subjektive Recht des Sinns über die Wirklichkeit. WILHELM BURKAMP. Berlin: Junker und Dünnhaupt. 1938. 327 pp.; 538 pp. 25 M.

Few philosophical works have come out of Germany in the past few years which are as comprehensive, systematic, or as competent as the present book. It discusses foundational problems in biology, genetics, psychology, and mathematical logic in addition to the customary philosophical topics and arbitrates the claims of conflicting schools, both philosophical and scientific. The author has obviously labored for years to create a system which would, without weak compromise, do full justice to all contenders and unify his

own perspectives, but his refusal to subscribe to any one school or trend of philosophy and his lavish sympathy with discordant tendencies, such as *Existenzphilosophie* and American behaviorism, or *Geisteswissenschaft* and pragmatism, make him in the end, like Humpty Dumpty, very difficult to put together.

Many of his separate discussions and criticisms are, however, very repaying. While he defends the theory of natural selection, for example, he also disengages it from the economics of the Manchester school, with which it is so often associated in Germany. He believes that the repugnance to Manchester economics, "the victory of the *a priori* in philosophy since 1900" and other circumstances having nothing to do with the scientific value of the selection theory, are at the bottom of the modern trend against it. His attitude toward the vitalists is naturally adverse. Although he gives Driesch credit for putting very sharply the issue between crude mechanism and vitalism, he quite rightly charges him with keeping up the fight when mechanists in his original sense no longer exist. After scoring the vitalists for their implicit indeterminism and rejection of future progress in biology, he shows that Driesch himself was not able to remain a vitalist.

One of the most central concepts of the author is the I, or the self. It is, he says, "the deepest depth of philosophical thematique," and it certainly plays a great part in his system. But it is extremely difficult to understand what it can mean and even more so, to account for the importance he attaches to it. "The deciding I is the unitary, reconciled, harmonized, consistent whole of all the validities in the mind of man," he says. The I is free in its decisions, and therefore responsible, but in what sense is not clear, although the I is said to form itself through its own conflicts and decisions. The evidence he gives to prove his point is mainly the difference observable between the waking state of a man and his disposition in dreams, day dreams, and inebriation. In the latter cases conscience, scruple, moral responsibility, and "the law of correction" do not function. Later in the book we realize that these submerged states of consciousness are characteristic of the "inferior races," and it becomes apparent that the author's views sometimes reflect the ideological atmosphere of Germany rather than the present stage of psychological research. Yet the naturalistic motif again and again is heard even in this discussion of the I. The conception of the self as a bloodless logical subject of acts (Natorp, Husserl) is rejected and the Cartesian dualism denied. The reason for dwelling upon Burkamp's confused admiration for the I is the importance he assigns to it in his system. Thus the I is said to bind together theory and practice and to be the key to

the understanding of moral responsibility. But ethical questions raised by the author are not answered. The problem of what the moral individual should do to "serve the community" is left to the decision of each isolated individual who must courageously face the issues without the author's help. Does a "superior people" in crowded quarters, such as the Germans, have a right to supplant an "inferior people," such as the Australian aborigines, who have room to spare? This question is put but not answered. It is left to the lonely Kierkegaardian self to decide freely, to find or, perhaps, to make the truth. Unfortunately, Burkamp is not nearly so plausible as Rickert, although very much under his influence. Perhaps his concrete examples are not well chosen for Americans, or non-Germans!

Burkamp's logic, like that of Rickert, is also haunted by the self which, in his opinion, plays a decisive rôle. For *"Nur in der Abhängigkeit von der Setzung eines Ich, das nach Wertgesetzen handelt, wenn auch im Einzelfall der Wertbedingtheit seiner Entscheidungsgründe sich nicht bewusst zu sein braucht, liegt auch hier die Berechtigung, von 'Sinn' zu sprechen"* (§ 934). Meaning depends on value-positing of the I, and implication, he argues, depends upon meaning. But this is only one of the connections which hold, in the author's view, between logic and the self.

In the logical sections of the book the author contends that Aristotle's argument for restricting the law of excluded middle rests upon confusion between the objective and subjective points of view. A judgment about the future may be true or false whether we know it or not, he says in effect. While he grants that the modern intuitionists are right in throwing out much mathematics which is supposed to be established by the law of excluded middle, he denies that the law is involved in these cases. The two propositions (*a*) If every number has the property φ, then p is true and (*b*) If the property φ fails for any number, p is true, do not prove that p *is* true; not, however, because the law of excluded middle is invalid but because the antecedents in (*a*) and (*b*) are not real contradictories, are not of the form p and $-p$. If p and $-p$ do not occur, however, the law of excluded middle is not involved. The author's sympathy with intuitionism, especially of the phenomenological sort, is also shown by his interesting contention that particular propositions contradict universals only under two conditions (1) when the universal proposition refers to a finite class of particulars all of which can be exhibited and (2) when I know at least one individual which does not belong to that class.

Most original in this connection, however, is the author's insistence that De Morgan's principle as usually interpreted, is in-

valid and, in the form Whitehead and Russell give it in *Principia Mathematica, "logisch sinnwidrig."* From the falsity of ($-p$ or $-q$) it does not follow, he argues, that p and q are both true, but only that it is *possible* that they are both true (§ 724). Substituting "possibly both true" for "both true" (or logical product) he restates the various forms of the law to discover that only one form is invalid, namely: The falsity of (p or q) implies the truth of ($-p$ and $-q$). Even this form of the law would be valid, he explains, "if it is already settled (*entschieden*) that one of the two propositions p, q, is either true or false" (§ 633). In general, however, this is precisely what we do *not* know when a disjunction is denied. He concludes therefore that in this case we can not infer that both p and q are false, but only that they are possibly so. Unfortunately, this argument is remarkably similar to Aristotle's argument in *Categoriae* against the applicability of the law of excluded middle to the future, which the author has already rejected (above). If Aristotle inferred objective indetermination from subjective indetermination in that case, Burkamp appears to do it here. But space does not permit an adequate criticism of the author's views. It is hard to understand how he expects to solve any problems by simply defining "class" as "well-ordered class," and many other things are unclear. The logical sections on the whole, however, are very suggestive and easily the best in the book.

The evaluation of the schools of philosophy is also interesting. After tracing the pragmatic motif in many philosophers, beginning with Kant, who are not usually regarded as pragmatists, the author announces that *as a practical man* he himself is satisfied with pragmatism. What he apparently means is that anyone who wants pragmatism to work should drop it when dealing with theory, and abide by theoretical principles. Unfortunately, the whole criticism is directed against James; while Dewey, because he is little known in Germany or harder to criticize, is scarcely mentioned. Logical positivism, in turn, is praised for its development of axiomatics but rapped for its conventionalism. The "principle of tolerance" which places all the emphasis on language overlooks, he believes, the fact that axiomatics can be carried out only by virtue of the meanings it derives from logic, as distinguished from language. The author also crosses swords with logical positivism, phenomenology, and the other schools in upholding the correspondence theory of truth, although he insists that only a complex functional concept, in the sense of Cassirer, will be adequate to reality. The approach to Husserl's philosophy is through *Schau* and *Wesensschau,* which is a pity, for no notions in this philosophy have been subject to more misunderstanding. But neither the elation of the

religious nor the dismay of the empiricists have been wholly justified. There is no objection to *Schau,* presumably, but only to its supposed infallibility. Although the interpretation of Husserl on this point is a difficult task at best one feels that the author would have qualified his charges of dogmatism and infallibilism in Husserl's philosophy, had he noted such passages as the following:

> Evidenz ist in der Tat nicht irgendein Bewusstseinsindex, der an ein Urteil (und gewöhnlich spricht man nur bei einem solchen von Evidenz) angeheftet, uns wie eine mystische Stimme aus einer besseren Welt zuruft: Hier ist die Wahrheit!, als ob solch eine Stimme uns freien Geistern etwas zu sagen und ihren Rechtstitel nicht auszuweisen hätte. [*Ideen,* sec. 145.]

On the other hand, the reminder that all trusting to mere *Schau* is a reliance on that which has become customary (§ 1050) and the warning that since phenomenologists tend to take the present practices and insights of scientists as *a priori* and self-evident, they may jeopardize the advance of science, seem to be sound and salutary.

This brief account reveals the uneven merits of the book. Sometimes it is rich in insights and suggestions, other times exceedingly weak, especially in the ethical and social discussions which are of central importance to his system. In conclusion the author has almost nothing to offer us to cure the evils of the world which in part he deeply appreciates. He speaks with some hope of rooting out individual egoism, without making clear, however, whether he has in mind the German worker or the Saar industrialist, and he puts some faith, he says, in the restoration of the racial inheritance by eugenics, with the Nietzschean superman as an ideal for the future. But being well-informed on biology he seems to derive little comfort from this prospect or from the old ideal of national or racial aggression. He speaks of the heavy responsibility for the future which weighs down the modern man and of the five hundred years of false optimism. His real answer to developments in Germany and the world is not a gauge, or a program for the future, but scattered comments and warnings, some quite out of line with Nazi ideology, leading to nothing but skepticism and pessimism.

V. J. McG.

La logica di Hegel. Luigi Pelloux. (Pubblicazioni della Università Cattolica del Sacro Cuore. Serie prima: Scienze Filosofiche. Volume XXIX.) Milano: "Vita e Pensiero." 1938. vi + 243 pp. 20 l.

This volume proposes, by means of a faithful but not pedantic adherence to the text of *Wissenschaft der Logik,* to unravel once more the old Secret of Hegel. The author undertakes to determine

the unique "significance of the Hegelian doctrine." In order to arrive at this proposed destination, it is carefully and correctly insisted that it is necessary to extract the *"nucleo centrale"* of Hegel's idealism. Following the lead of the Italian reformers of the Hegelian logic, especially Spaventa, Croce, and Gentile, Signor Pelloux is convinced that the "central nucleus" of Hegel's thought is the *dialectic* with its "characteristic triadic rhythm." He concludes that the permanent significance of the Hegelian philosophy is the effort to unify logic and metaphysics, and to resolve the latter into the former. The root of this identity of logic and metaphysics, which implies directly a *"metafisica del logo"* rather than a *"metafisica dell'essere,"* is the new *"logica del concreto"* provided by the dialectic of thinking, as opposed to the old Aristotelian *"logica dell'astratto."* (We may point out in passing that Gentile in the *"Origine e significato della logica di Hegel"* published in *La Critica* in 1904 implicitly reached the same conclusion concerning Hegel's "effort.")

At the end of the book a penetrating question is raised: Can the titanic effort to unify logic and metaphysics, thinking and being, be successful? The author convincingly suggests that the Hegelian "logic of the concrete" results in an embarrassing antinomy between its "formal" and its "mediate" properties. As the *"formalità della logica"* is affirmed, the possibility of a genuine *"mediazione"* disappears. On the one hand, the identification of logic and metaphysics is based on the assertion that there is no being, datum, or content transcendent to thinking or form. Content is content in so far as it is form and nothing but form. But, on the other hand, mediation is the "mediation of a given." Now if such a given is made illusory mediation ceases. If such a given is not made illusory, then logic is no longer identical with metaphysics, because there is a given or content presupposed to which logic comes to be applied. In other words, one might put it proverbially, the Hegelian logic can not have its cake (its mediate character) and eat it (its formal character). "In such an antinomy the whole of the Hegelian logic crumbles, and in that consists its permanent fragility," concludes Signor Pelloux.

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Die Einheit der Person. Eine theologische Studie zur Philosophie Ludwig Klages'. CARL HEINZ RATSCHOW. Halle: Max Niemeyer. 1938. viii + 268 pp. 9 M.

Like many other theologians, Ratschow has been impressed by the dark thoughts of Klages. The major portion of this book (pp.

18–188) is devoted to expounding Klages' views in systematic form. Frequent and apt quotations are introduced and the exposition is as clear as Klages' system allows. Ratschow, however, finds that Klages' thought calls for a positive development along metaphysical lines. This he attempts to provide through his own theological orientation towards God and the Self. This development is so out of line with the motivating drive in Klages' thought that one is forced to wonder why contemporary theologians should take Klages so seriously. This will provide a minor but interesting problem for the future historians of *Lebensphilosophie.*

M. M.

Les états du texte de Plotin. PAUL HENRY. (Études Plotiniennes, I.) (Museum Lessianum, Section Philosophique, No. 20.) Paris: Desclée de Brouwer et Cie. Bruxelles: L'Edition universelle. 1938. xxviii + 425 pp. 100 fr. belges.

In the present volume, one of a series devoted to the study of the works of Plotinus and his school, the learned author attempts to reconstruct the various stages of the text of the *Enneads* from the medieval MS. tradition, early editions, and citations from Plotinus in the writings of the Greek Fathers and Byzantine philosophers. After discussing the various approaches to the problems of a critical edition, he offers us (1) the titles of the chapters of the *Enneads* as they are found in the MSS. of Plotinus, in the Table of Porphyry, and in the Canon of Porphyry, as well as the *incipit* citations; (2) a discussion of the MSS. of Plotinus, their date, history, and sources, and the Greek text of sections of the *Enneads* contained in the writings of Porphyry, Eusebius, Cyril, Theodertus, Basil, Proclus, Simplicius, etc.; (3) materials from the scholia. To the main contents is appended a detailed index of ancient authorities.

It is impossible in this brief note to do justice to the importance of the material presented or of the problems of method or the author's treatment of philological details. From a sampling of selected passages the reviewer is convinced that Père Henry's laborious research must form the basis of any definitive edition of Plotinus and that the volume is indispensable to all students of Neoplatonic philosophy. The author's industry and learning are astonishing; no less remarkable is his philological ingenuity. A critical reader can not fail to learn much from a study of the commentary on the sections cited, not only from the point of view of

Plotinus's indebtedness to predecessors, but also as a specimen of philological method and textual reconstruction.

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OTHER NEW BOOKS AND JOURNALS

Kant, Immanuel: Perpetual Peace. With an Introduction by Nicholas Murray Butler. New York: Columbia University Press. 1939. ix + 67 pp. $1.00. (A new edition of an English translation, in London, of 1796.)

Greenwood, W. Osborne: Biology and Christian Belief. New York: Macmillan Company. 1939. 192 pp. $1.75.

SOPHIA. Anno VI, No. 4. Orientamenti della filosofia contemporanea in Italia: *Francesco Orestano.* Sur les rapprochements entre Saint Augustin et l'idéalisme: *Charles Boyer.* L'ontologismo di "De la recherche de la verité" e il suo significato ideale: *Emilio Chiocchetti.* Il problema gnoseologico nella filosofia di M. Blondel: *Alfredo Poggi.* Ancient Rhetoric and Empirical Method: *Phillip and Estelle de Lacy.* G. Scoto Eriugena e il significato del suo pensiero: *Filippo Missosevich.*

BOLLETINO FILOSOFICO. Anno IV, Num. 4. Il problema della certezza nell'atto della mente: *S. E. Giannattasio.* La trascendenza della vita nel pensiero tomista: *M. Fatta.* La questione del momento in cui l'anima razionale è infusa nel corpo: *A. Lanza.*

NOTES AND NEWS

The Fifth Conference on Methods in Philosophy and the Sciences will take place on Sunday, May 14, 1939, at the New School for Social Research, New York City. The morning session from 9:30 to 12:00 will be a symposium on "What is the Science of Economics?" The speakers are Professor J. M. Clark of the Department of Economics of Columbia University, and Professor Simon Kuznets of the Department of Economics at the University of Pennsylvania. At the afternoon session, 2:30–4:30, there will be a symposium on "The Premises of Legal Thinking." Professor Karl Llewellyn and Professor Jerome Michael of Columbia University Law School will be the speakers.

Professor Arthur E. Murphy of Brown University has accepted the position as head of the Department of Philosophy at the University of Illinois.